

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application.

Listing of Claims:

1 (currently amended). A method of demodulating a received signal corresponding to a plurality of transmitted symbol sequences originating from both a first user and a second user, the method comprising:

initializing, using known pilot symbols for the first user and the second user, a first-user symbol sequence corresponding to the first user and a second-user symbol sequence corresponding to the second user and channel estimates for the first user and the second user wherein the first user and the second user can be asynchronous ; and jointly detecting the first-user symbol sequence and the second-user symbol sequence using, at each of a plurality of iterations previous first and second user symbol sequences and the channel estimates for the first user and the second user, and based on the use of transmit diversity by at least one of the first user and the second user and on a pulse shape component applied to symbols from prior iterations.

2 (original). The method of claim 1 further comprising updating the channel estimates prior to each of the plurality of iterations.

3 (original). The method of claim 1 wherein channel estimates are obtained using alternate pilot channels in a code division multiplexed access (CDMA) system.

4-6 (cancelled).

7 (currently amended). A method of demodulating a received signal corresponding to a plurality of transmitted symbols originating from both a first user and a second user, the method comprising:

initializing, using known pilot symbols for the first user and the second user, a
first-user symbol corresponding to the first user and a second-user symbol
corresponding to the second user and channel estimates for the first user and the
second user wherein the first user and the second user can be asynchronous;

jointly detecting a first-user symbol and a second-user symbol at a current
symbol time using previous first and second user symbols and channel estimates for
the first user and the second user, and based on the use of transmit diversity by at least
one of the first user and the second user; and

if additional symbol times remain, jointly detecting the first user symbol and
the second user symbol at a next symbol time.

8 (original). The method of claim 7 further comprising:

predicting the channel estimates for a next symbol time, at least in part through
the use of channel tracking; and

updating the first-user symbol and the second-user symbol.

9 (currently amended). The method of claim 7 wherein:

the initialization further comprises the initialization of a pulse-shape
component; and

the jointly detecting is accomplished at least in part through reference to the
pulse-shape component applied to symbols from prior iterations.

10 (currently amended). The method of claim 8 wherein:

the initialization further comprises the initialization of a pulse-shape
component; and

the jointly detecting is accomplished at least in part through reference to the
pulse-shape component applied to symbols from prior iterations.

11 (currently amended). Apparatus for demodulating a received signal corresponding to a plurality of transmitted symbol sequences originating from both a first user and a second user, the apparatus comprising:

means for initializing, using known pilot symbols for the first user and the second user, a first-user symbol sequence corresponding to the first user and a second-user symbol sequence corresponding to the second user wherein the first user and the second user can be asynchronous;

means for initializing channel estimates for the first user and the second user, using the known pilot symbols for the first user and the second user; and

means for iteratively and jointly detecting the first-user symbol sequence and the second-user symbol sequence using previous first and second user symbol sequences and the channel estimates for the first user and the second user, and based on the use of transmit diversity by at least one of the first user and the second user and on a pulse shape component applied to symbols from prior iterations.

12 (currently amended). Apparatus for demodulating a received signal corresponding to a plurality of transmitted symbols originating from both a first user and a second user, the apparatus comprising:

means for initializing, using known pilot symbols for the first user and the second user, a first-user symbol corresponding to the first user and a second-user symbol corresponding to the second user wherein the first user and the second user can be asynchronous;

means for initializing channel estimates for the first user and the second user, using known pilot symbols for the first user and the second user; and

means for jointly and recursively detecting a first-user symbol and a second-user symbol at specific symbol times using previous first and second user symbols and channel estimates for the first user and the second user, and based on the use of transmit diversity by at least one of the first user and the second user.

13 (currently amended). A receiving system operable to demodulate a received signal corresponding to a plurality of transmitted symbol sequences originating from both a first user and a second user, the system comprising:

a channel estimation unit operable to produce channel estimates for the first user and the second user, using known pilot symbols for the first user and the second user; and

a detector unit operatively connected to the channel estimation unit, the detector unit operable to jointly detect a first-user symbol sequence and a second-user symbol sequence using previous first and second user symbol sequences, the known pilot symbols for the first user and the second user, and the channel estimates for the first user and the second user, wherein the first user and the second user can be asynchronous, and based on the use of transmit diversity by at least one of the first user and the second user and on a pulse shape component applied to symbols from prior iterations.

14 (original). The system of claim 13 wherein the channel estimation unit updates the channel estimates prior to each of a plurality of iterations.

15 (original). The system of claim 13 wherein the channel estimation unit obtains channel estimates using alternate pilot channels in a code division multiplexed access (CDMA) system.

16-18 (cancelled).

19 (currently amended). A receiving system operable to demodulate a received signal corresponding to a plurality of transmitted symbols originating from both a first user and a second user, the system comprising:

a channel estimation unit operable to produce channel estimates for the first user and the second user, using known pilot symbols for the first user and the second user; and

a detector unit operatively connected to the channel estimation unit, the detector unit operable to jointly detect a first-user symbol and a second-user symbol at specific symbol times using previous first and second user symbols, the known pilot symbols for the first user and the second user, and the channel estimates for the first user and the second user, wherein the first user and the second user can be asynchronous, and based on the use of transmit diversity by at least one of the first user and the second user.

20 (original). The system of claim 19 wherein the detector unit further comprises a symbol update unit and the symbol update unit and the channel estimation unit each further comprise:

reformulation operators;
conjugation operators connected to the reformulation operators; and
multipliers and adders interconnected with the reformulation operators and conjugation operators.

21 (original). The system of claim 19 wherein the channel estimation logic predicts channel estimates at least in part through channel tracking.

22 (original). The system of claim 20 wherein the channel estimation logic predicts channel estimates at least in part through channel tracking.

23 (currently amended). The system of claim 19 wherein the detector unit is further operable to refer to a pulse shape component applied to symbols from prior iterations.

24 (currently amended). The system of claim 20 wherein the detector unit is further operable to refer to a pulse shape component applied to symbols from prior iterations.

25 (currently amended). The system of claim 21 wherein the detector unit is further operable to refer to a pulse shape component applied to symbols from prior iterations.

26 (currently amended). The system of claim 22 wherein the detector unit is further operable to refer to a pulse shape component applied to symbols from prior iterations.

27 (currently amended). A mobile terminal comprising:

a processor system for controlling the operation of the mobile terminal;
a radio block operable to transmit signals, and also to receive signals
corresponding to a plurality of transmitted symbols originating from both a first user
and a second user;

baseband logic operatively connected to the radio block and the processor
system, the baseband logic further comprising a channel estimation unit operable to
produce channel estimates for the first user and the second user, using known pilot
symbols for the first user and the second user, and a detector unit operatively
connected to the channel estimation unit, the detector unit operable to jointly detect
first-user symbols and second-user symbols based on the channel estimates for the
first user and the second user, and using the known pilot symbols for the first user and
the second user, wherein the first user and the second user can be asynchronous, and
based on the use of transmit diversity by at least one of the first user and the second
user and on a pulse shape component applied to symbols from prior iterations.

28 (original). The mobile terminal of claim 27 wherein the channel estimation unit
performs block estimation and the detector unit performs block detection of the first user
symbols and the second user symbols.

29 (original). The mobile terminal of claim 27 wherein the channel estimation unit
performs recursive estimation using channel tracking and the detector unit performs recursive
detection of the first user symbols and the second user symbols.

30 (cancelled).

31 (original). The mobile terminal of claim 27 wherein the channel estimation unit produces channel estimates by referring to alternate pilot channels in a code division multiplexed access (CDMA) system.

32 (original). The mobile terminal of claim 27 wherein the detector unit further comprises a symbol update unit, and the symbol update unit and the channel estimation unit each further comprise:

- reformulation operators;
- conjugation operators connected to the reformulation operators; and
- multipliers and adders interconnected with the reformulation operators and conjugation operators.

33 (original). The mobile terminal of claim 29 wherein the detector unit further comprises a symbol update unit, and the symbol update unit and the channel estimation unit each further comprise:

- reformulation operators;
- conjugation operators connected to the reformulation operators; and
- multipliers and adders interconnected with the reformulation operators and conjugation operators.

34 (cancelled).

35 (new). The method of claim 7 where the jointly detecting can be accomplished at least in part by estimating the plurality of symbols out of natural order.

36 (new). The method of claim 9 where the jointly detecting can be accomplished at least in part by estimating the plurality of symbols out of natural order.

37 (new). The receiving system of claim 19 wherein the detector unit is further operable to detect the first user symbol and the second user symbol out of natural order.

38 (new). The receiving system of claim 23 wherein the detector unit is further operable to detect the first user symbol and the second user symbol out of natural order.

39 (new). The mobile terminal of claim 27 wherein the detector unit is further operable to detect the first user symbol and the second user symbol out of natural order.